

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior version, and listings, of claims in the application:

Listing of Claims:

Claims 1-6 (canceled).

7. (New) An apparatus for detecting a vehicle rollover, comprising:
 - a sensor suite for sensing vehicle dynamics data and rollover data; and
 - a processor connected to the sensor unit, wherein the processor categorizes an operating state of the vehicle into one of a plurality of successive phases, and wherein the processor determines, for each phase, a float angle and a transverse vehicle velocity from the vehicle dynamics data and the rollover data, and wherein the vehicle rollover is detected based on the float angle and the transverse vehicle velocity.
8. (New) The apparatus as recited in Claim 7, wherein the chronologically successive phases include a stable operating state, a breakaway state, and a skid state, wherein the stable operating state is characterized by a substantially constant value of the float angle, the breakaway state is characterized by a large change in the float angle, and the skid state is characterized by a value of the float angle that is greater than a predefined threshold value.
9. (New) The apparatus as recited in Claim 7, wherein the vehicle dynamics data includes at least one of a longitudinal vehicle velocity, a yaw rate and a transverse vehicle acceleration.
10. (New) The apparatus as recited in Claim 8, wherein the vehicle dynamics data includes at least one of a longitudinal vehicle velocity, a yaw rate and a transverse vehicle acceleration.
11. (New) The apparatus as recited in Claim 9, wherein the sensor suite additionally detects and outputs at least one of a wheel rotational speed, a longitudinal vehicle acceleration, a steering angle, and an estimate of the float angle.
12. (New) The apparatus as recited in Claim 10, wherein the sensor suite additionally detects and outputs at least one of a wheel rotational speed, a longitudinal vehicle acceleration, a steering angle, and an estimate of the float angle.
13. (New) The apparatus as recited in Claim 7, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.

14. (New) The apparatus as recited in Claim 8, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.
15. (New) The apparatus as recited in Claim 9, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.
16. (New) The apparatus as recited in Claim 10, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.
17. (New) The apparatus as recited in Claim 11, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.
18. (New) The apparatus as recited in Claim 12, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.
19. (New) An apparatus for detecting a vehicle rollover, comprising:
 - a sensor suite for sensing vehicle dynamics data and rollover data; and
 - a processor connected to the sensor unit, wherein the processor categorizes an operating state of the vehicle into one of a plurality of successive phases, and wherein the processor determines, for each phase, a float angle and a vehicle center-of-mass velocity from the vehicle dynamics data and the rollover data, and wherein the vehicle rollover is detected based on the float angle and the vehicle center-of-mass velocity.
20. (New) The apparatus as recited in Claim 19, wherein the chronologically successive phases include a stable operating state, a breakaway state, and a skid state, wherein the stable operating state is characterized by a substantially constant value of the float angle, the breakaway state is characterized by a large change in the float angle, and the skid state is characterized by a value of the float angle that is greater than a predefined threshold value.
21. (New) The apparatus as recited in Claim 19, wherein the vehicle dynamics data includes at least one of a longitudinal vehicle velocity, a yaw rate and a transverse vehicle acceleration.
22. (New) The apparatus as recited in Claim 20, wherein the vehicle dynamics data includes at least one of a longitudinal vehicle velocity, a yaw rate and a transverse vehicle acceleration.
23. (New) The apparatus as recited in Claim 21, wherein the sensor suite additionally detects and outputs at least one of a wheel rotational speed, a longitudinal vehicle acceleration, a steering angle, and an estimate of the float angle.

24. (New) The apparatus as recited in Claim 22, wherein the sensor suite additionally detects and outputs at least one of a wheel rotational speed, a longitudinal vehicle acceleration, a steering angle, and an estimate of the float angle.

25. (New) The apparatus as recited in Claim 22, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.

26. (New) The apparatus as recited in Claim 24, wherein the apparatus is connected to a restraint system that is activated by the processor based on the detection of the rollover.